

LAND POTENTIAL STUDY NEW HANOVER COUNTY, N. C.

SUMMARY

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Department of Conservation and Development

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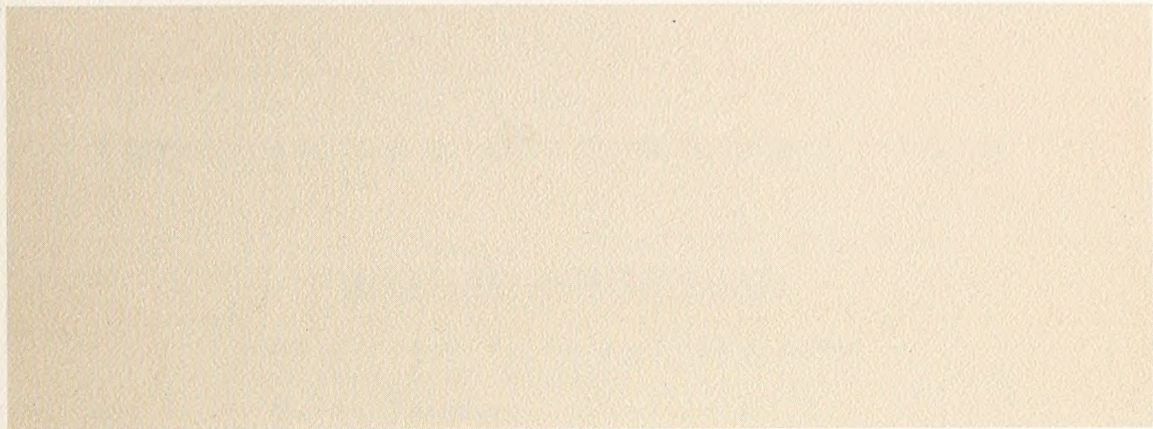
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ABSTRACT: Analyzes existing pattern and intensity of land uses within New Hanover County to determine major characteristics and problems in the use of land. Emphasis placed on problems involving ground and surface water, drainage and soil characteristics. Interrelationships of land uses and features are analyzed to determine prime areas for future development into specific urban and urban-supporting uses. Study provides factual basis for future preparation of a Land Development Plan.



**LAND POTENTIAL STUDY
NEW HANOVER COUNTY, N. C.**

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N87L

PREPARED FOR NEW HANOVER COUNTY, NORTH CAROLINA

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Technical Assistance For the Preparation of This Report By:

NORTH CAROLINA DEPARTMENT OF CONSERVATION AND DEVELOPMENT
DIVISION OF COMMUNITY PLANNING

George J. Monaghan - Administrator
James A. Ferguson - Director, Eastern Area Office
Timothy Wood, Project Planner

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Agencies Providing Information and Review

U. S. Corps of Engineers, Wilmington District
U. S. Department of Agriculture, Soil Conservation Service
U. S. Department of Agriculture, Farmers Home Administration
U. S. Department of Interior, Geological Survey
N. C. Department of Water and Air Resources
N. C. Department of Conservation and Development, Division
of Commerce and Industry
N. C. State Ports Authority
New Hanover County, Agricultural Extension Service
New Hanover County, Health Department
Wilmington-New Hanover Planning Department

PREFACE

What is New Hanover County? Is it a geographical entity, a political unit, or a collection of buildings and people? What is its destiny? Is it to become an industrial giant, a vacation resort, and a pleasant place to work and live? Will its citizens have good job opportunities, decent housing, and an attractive physical, social, and cultural environment?

These are the type of questions that this Land Potential Study will consider. Answers to all these questions will not be found, but an attempt will be undertaken in the following pages to show what potential for urban development exists in New Hanover County and to determine those factors that present obstacles to urban development.

It is the desire of the Wilmington-New Hanover Planning Board to provide a realistic appraisal of the county - its assets and liabilities, its attractions and its drawbacks, in order to determine what future urban and rural land use patterns may be expected in the county.



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CHAPTER ONE
NATURAL FEATURES AFFECTING DEVELOPMENT

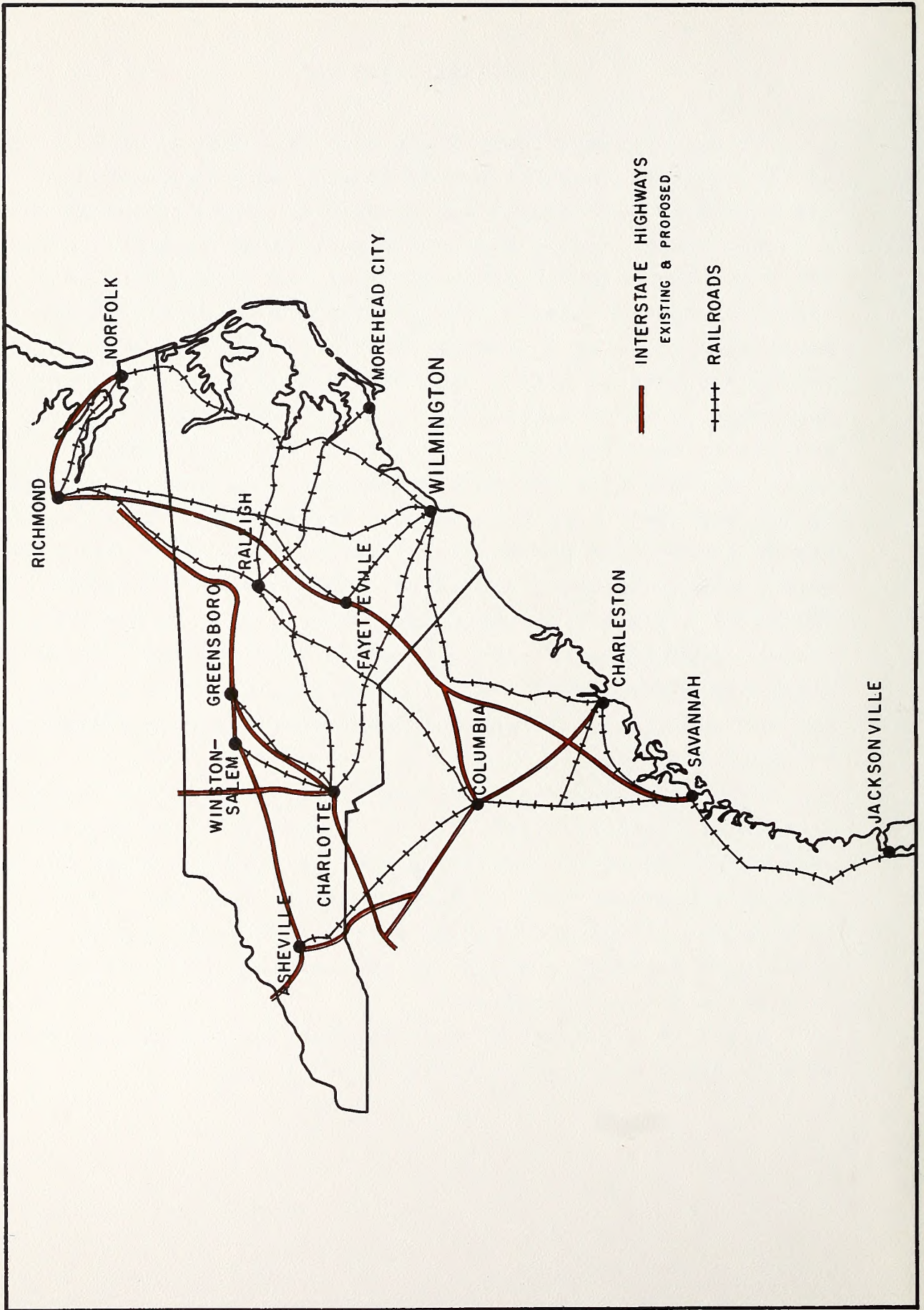
REGIONAL SETTING

Situated in southeast North Carolina, New Hanover is one of the smallest counties in the state. Only Chowan County has a smaller land area. New Hanover is shaped somewhat like a funnel and is almost completely surrounded by water. To the east, the Atlantic Ocean provides the county with an important tourist asset. To the west, the Cape Fear River provides deep water access to the Port of Wilmington - another invaluable natural asset. The Cape Fear has been accurately described as a "working river". Attractive walkways, parks, and scenic overlooks of the waterfront are conspicuous by their absence. The northern boundary of New Hanover is marked by the Northeast Cape Fear River. North of the river, neighboring Pender County consists of low-lying agricultural and forest lands, sparsely populated. To the west, Brunswick County is a heavily forested area with an economy based on forest products, agriculture, seafood, and tourism. Industry currently plays a small role in Brunswick County's economy, but an industrial development commission is actively promoting industrial sites.

U. S. 421 provides access to the industrialized Piedmont section of North Carolina. U. S. 74 traverses the southern regions of the state, providing a major traffic artery to Charlotte and Asheville in Western North Carolina. U. S. 17 is a major north-south highway providing access to North Carolina's coastal towns and to the neighboring state of Virginia and South Carolina.

Map 1 is presented to show New Hanover County's relationship to North and South Carolina's major cities.

WILMINGTON REGIONAL AREA



GEOLOGY, GROUND WATER, AND MINERAL RESOURCES

Since ground water is an important water source in New Hanover County, it is necessary to determine the location as well as quality and quantity of the ground water supply in relation to the geologic formation in which it is located. Also, attention will be given to the potential that ground water has for urban development in the county.

In New Hanover County, ground water is obtained from three geologic formations which are associated with three geologic ages. The geologic formations and ages pertaining to ground water are the Peedee formation of the Upper Cretaceous Age, the Castle Hayne limestone formation of the Eocene Age, and the surficial sands of the Post-Miocene Age. (See Geologic Cross Section, Map 2). Each formation is discussed below as to its location and its quality and quantity of ground water.

The surficial sands cover the eastern and southern area of the county from a line running parallel with U. S. Highway 17 and extending eastward to the coast. Water from this formation can be obtained quickly and cheaply because the water table is close to the surface. Recharge facilities (ability of the water-bearing formation to retain its water supply) are excellent because of the permeable sand at the surface, and as a result, the quantity of water in the formation is great. The water is generally soft but highly corrosive. It is low in dissolved solids and mineral matter, but it is high in iron content which causes objectionable stains on utensils, plumbing fixtures, etc.

There is another area covered with surficial sand, however, that is of great importance in the consideration of ground water supply. This is the sand hills area located between the Cape Fear River and the Northeast Cape Fear River extending about two miles northeast of Hilton Park northwestward for several miles. Being soft as well as having a

low iron and chloride content, the water from the area is of good quality. The water is slightly corrosive but not as corrosive as the water from the surficial sands along the coast. In addition, the sand hills area has good ability to recharge its water supply due to the excellent permeability of the sand. As a result, wells in the area yield a large supply of water. A well at the Carolina Power and Light Plant is reported to yield 480 gallons a minute with only five feet of drawdown.

The remainder of the county from U. S. Highway 17 westward is surficially covered by the Castle Hayne limestone formation. This formation has a large water supply due to its excellent recharge facilities. Most wells in the formation yield from 200 to 400 gallons of water a minute. Water from the formation is moderately hard to very hard and is generally high in iron content. Hydrogen sulphide is also present and produces a slight odor.

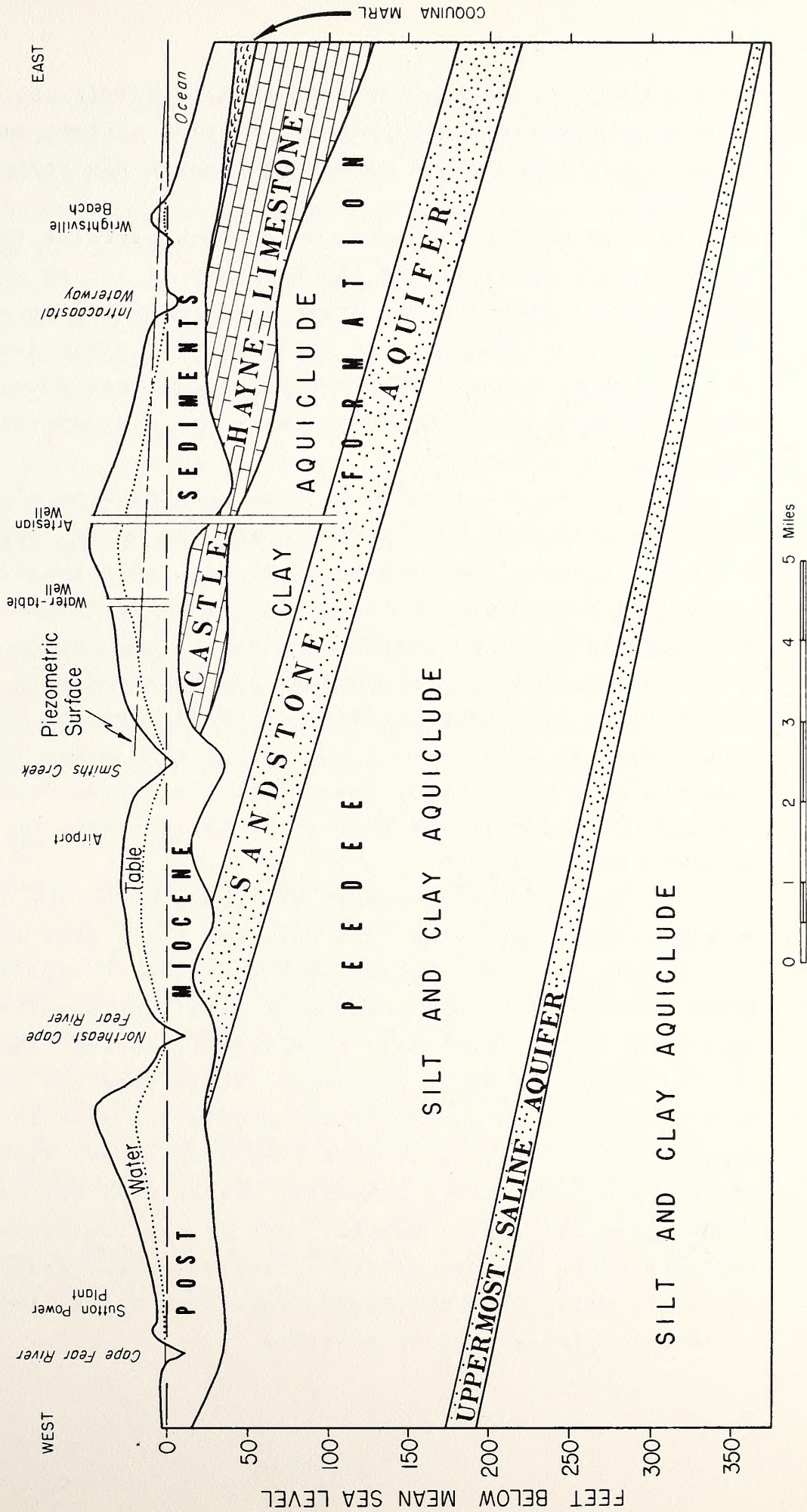
The Peedee formation is the underlying formation throughout the entire county, and it occurs near the surface only in the extreme western part of the county in the area between the Cape Fear River and the Northeast Cape Fear River. The water in this formation is generally hard and is low in mineral matter (iron, silica, sulphate). The potential water supply, however, is limited due to the presence of salt water in the formation. Contact between fresh water and the underlying salt water exists within the Peedee formation everywhere in the county. (See Geologic Cross Section, Map 2).

The presence of salt water, as mentioned above, is an important factor to consider in evaluating the potential of ground water in the county. Generally, salty water may be encountered in most of the county from 200 feet to 300 feet except in the southeastern section where it is 300 feet to 400 feet. In addition, great care must be taken to prevent excessive drawdown of the water level which would lead to infiltration of salt water into the fresh water supply. In

NEW HANOVER COUNTY

GEOLOGIC CROSS SECTION MAP

MAP NO. 2



order to prevent salt water intrusion, periodic checks should be made to ascertain the current chloride content of ground water. Chloride content should not exceed 250 parts per million.

By considering the above data which pertains to the location, the quality, and the quantity of ground water, certain conclusions can be drawn concerning the potential or the restrictions that ground water has for urban development in New Hanover County. The two types of urban development most closely related to ground water are residential and industrial development.

The ground water with the best potential supply for residential development is the water from the Castle Hayne limestone formation, largely because of its large quantity. As previously stated, water from this formation is generally hard and high in iron content but not to the extent that it poses any significant limitations for domestic use. The highly corrosive characteristic of water from the surficial sand along the coast limits the use of this water for domestic purposes. Also, water from the Peedee formation is limited for domestic use because of the presence of salt water in the formation.

The best potential supply of ground water for industrial development is the water from the sand hills area located between the Cape Fear River and the Northeast Cape Fear River. Water from this area is of excellent quality with an excellent yield potential. As a result, several industries have already located in the area. Water from the Castle Hayne formation is generally acceptable for most industrial uses, but the presence of high iron content may limit its use for some industrial purposes. Water from the surficial sands along the coast, however, has severe limitations for industrial use because of its corrosive characteristic. In addition, water from the Peedee formation has a limited potential because salt is present.

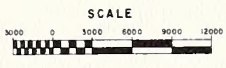
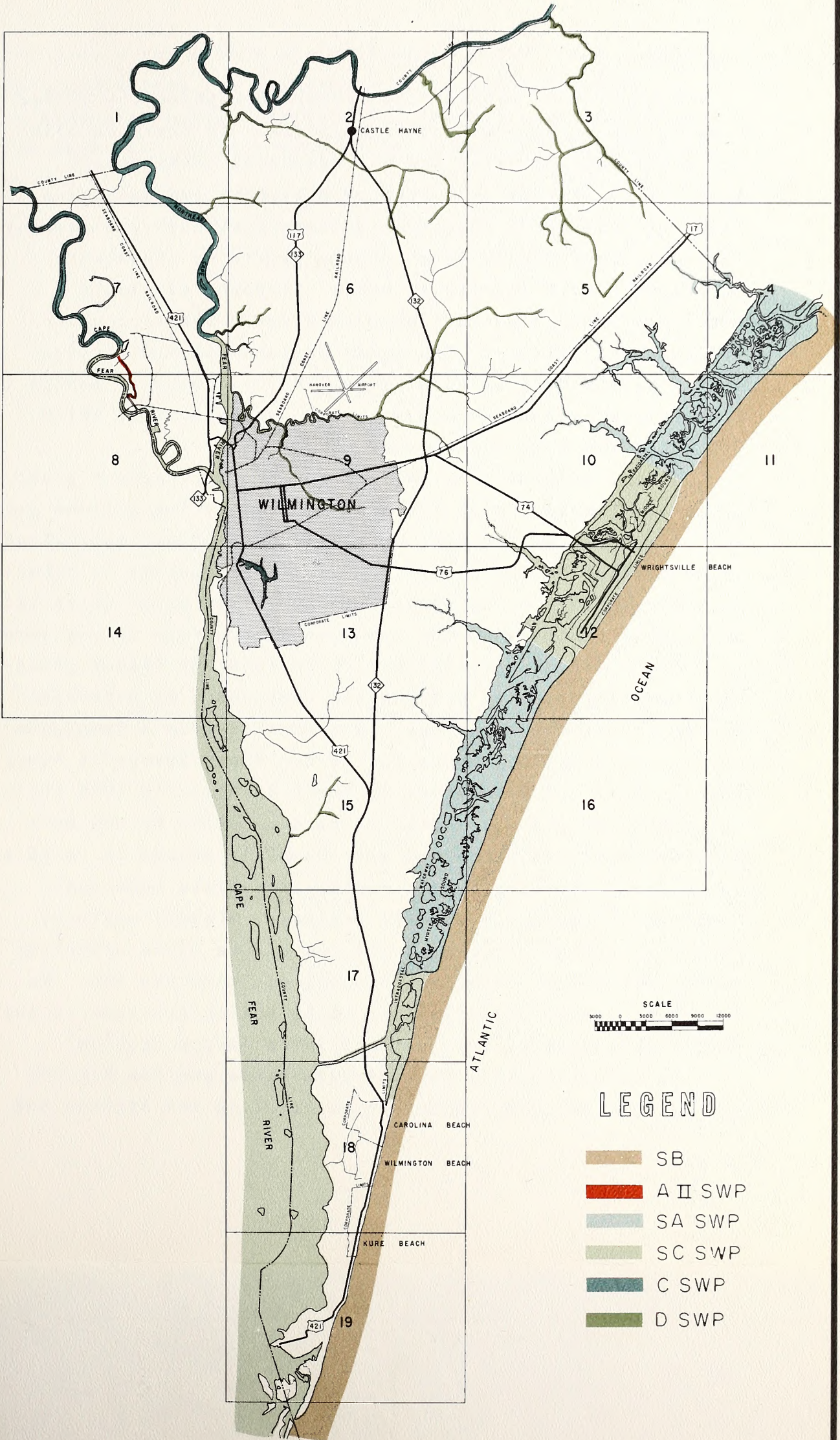
The only known mineral resource of significance in New Hanover is limestone. Limestone is present in large quantities in the western section of the county. The extraction of the mineral is economical because the limestone formation is present near the surface.

Limestone is used in large quantities by the Ideal Cement Company in the manufacture of portland and masonry cement. This cement is shipped to many areas within the United States as well as to foreign countries. Shipments of cement have steadily increased from the Ideal Cement Company's plant at Castle Hayne since its opening, and this trend is expected to continue. Some parts of the Castle Hayne limestone, due to silicification, are desirable and are being quarried for use in road construction and in the manufacture of concrete. Most of the limestone for these purposes is extracted by the Superior Stone Company at its Castle Hayne quarry. Because of increasing demands for the above items which are manufactured from limestone, it appears that this resource has great potential for industrial growth in New Hanover County.

Surface Water

New Hanover County's surface water is provided by two major rivers, the Cape Fear and the Northeast Cape Fear. Numerous creeks drain into these rivers while other creeks drain into the Intracoastal Waterway. The surface waters of the county are not useable as sources of potable or industrial cooling water due to high salinity or brackishness. Map 3 shows the major surface waters together with the classification assigned by the State Stream Sanitation Committee. These classifications are based on existing or contemplated best usage of waters. The following description of stream classifications found in New Hanover County will serve as a guide to the surface water map.

<u>CLASS</u>	<u>SUITABILITY</u>
A II (Swp)	Source of water supply for drinking, culinary, or food-processing purposes after approved treatment equal to coagulation, sedimentation, and disinfection and any other usage requiring water of a lower quality.
C (Swp)	Suitable for fish and wildlife propagation and any other usage requiring waters of lower quality.
D (Swp)	Suitable for agriculture and for industrial cooling and process water after treatment by the user as may be required under each particular circumstance.
SA	Suitable for shellfishing for market purposes and any other usage requiring waters of lower quality.
SB	These waters under proper sanitary supervision will be considered safe for bathing and any other usage except shellfishing for market purposes.
SC	Suitable for fishing and fish propagation and any other usage except bathing or shellfishing for market purposes.



LEGEND

- SB
- A II SWP
- SA SWP
- SC SWP
- C SWP
- D SWP

Pollution

Pollution of streams and rivers throughout the United States is a problem of growing concern. In North Carolina, the Department of Water and Air Resources continuously inspects facilities of suspected polluters and maintains files of offenders. Records indicate that only one company in New Hanover County is currently providing inadequate treatment of its industrial waste. Industrial plants currently under construction have planned adequate waste treatment facilities. The major pollutor in New Hanover County is the City of Wilmington. No treatment of sewage is presently provided. Raw sewage is discharged into Smith Creek and the Cape Fear River.

At the present time, Wilmington has a treatment plant under construction with a capacity of 8 million gallons per day. It is estimated that this plant will treat approximately 60 percent of the city's sewage. Construction is scheduled to begin in 1969 on an additional treatment plant which will be capable of treating the remaining percentage of raw sewage.

The obvious potential health hazards and visual offensiveness of pollution are further compounded by potential damage to estuarine ecology. A quotation from a Symposium on Estuarine Ecology sponsored by the Water Resources Research Institute at the University of North Carolina in 1966 aptly describes the problem. "As our coastal areas become more heavily populated, more and more domestic sewage is reaching our waters. Leaking septic tanks, inadequate municipal treatment, inadequate natural drainage, storms, marinas, overboard sewage disposal - all contribute micro organisms to the estuaries. Some are pathogenic, some are not. We know that sewage pollution can cause health problems in our shellfish industry, but just how large is the problem?"

In summation, the City of Wilmington and New Hanover County must proceed vigorously to clean up its streams and

rivers, reduce the number of inefficient septic tank disposal systems, and hasten the completion of an adequate urban sewage treatment plant. Failure to take concerted action in this area will inhibit urban development of a desirable nature.

CLIMATE

The climate of New Hanover County is mainly determined by its position in temperate latitudes and is distinctly modified by the influence of the Atlantic Ocean. New Hanover experiences higher winter temperatures than inland counties and the summer heat is moderated by sea breezes. The cooling effect of the sea breeze is illustrated by the fact that at Wilmington the temperature reaches 90° on an average of only 28 days a year, while inland at Raleigh 90° temperatures occur 43 days a year.^{1/} Along the coast on many occasions, the highest temperature on a summer day is reached during the morning, with the sea breeze setting in by noon and lowering temperatures by 5 or more degrees.

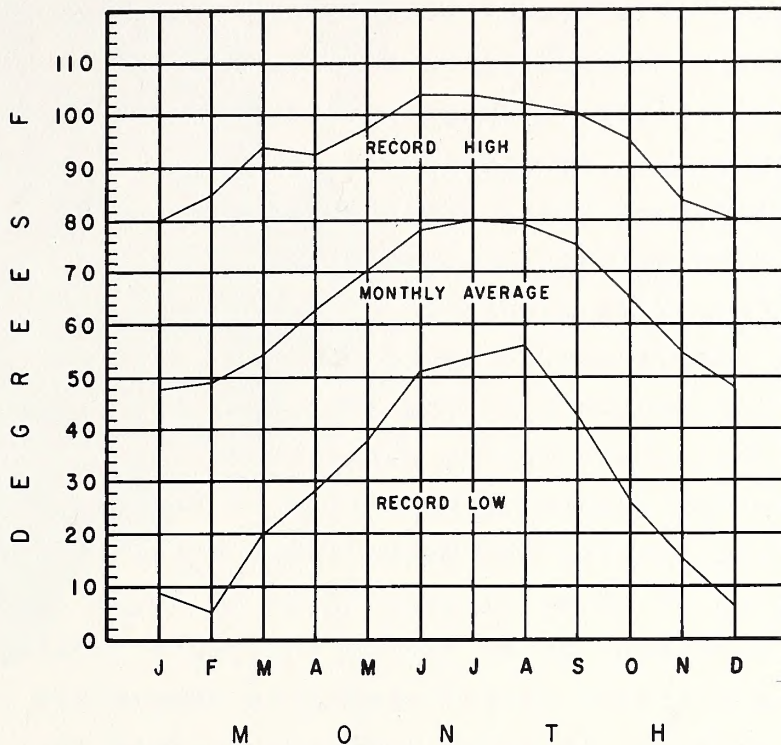
The winter months are considerably milder in New Hanover County than those experienced in inland counties. During these months there is over 61 percent sunshine - a figure that is only exceeded by Florida among all other Atlantic coastal areas. In an average year the temperature drops below 32° on 29 occasions providing the county with a long frost-free season.

The prevailing wind direction is southwest for 8 months of the year, northeast for 3 months, and westerly for 1 month. The mean hourly speed of the wind is 9.6 mph.

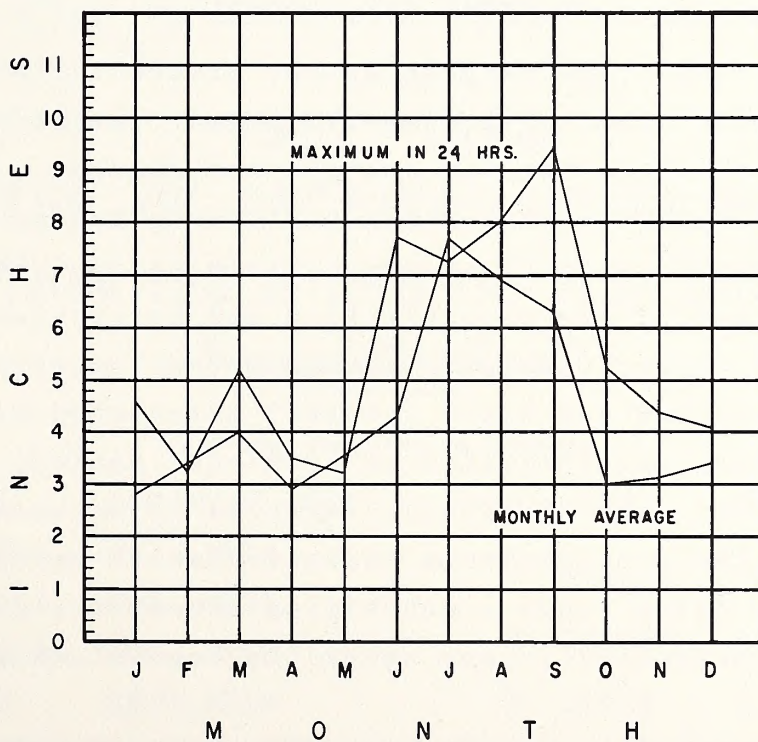
A cooperative beach erosion control and interim hurricane survey study performed by the U. S. Corps of Engineers and printed by the U. S. Government Printing Office in 1962 contains valuable material concerning hurricane frequency, intensity, and damage to property in New Hanover County. According to this report a total of 54 hurricanes have affected the area of Carolina Beach and vicinity during the

^{1/} Source: Weather and Climate in N. C., NCSU, Agricultural Experiment Station, Bulletin 396, December, 1964.

TABLE I
TEMPERATURE DATA
NEW HANOVER COUNTY
(WILMINGTON STATION)



PRECIPITATION DATA
NEW HANOVER COUNTY
(WILMINGTON STATION)



20th century. Of this total, 22 hurricanes have been classified as major or moderate because of the manner in which they affected the area studied by the Corps of Engineers (Carolina Beach and vicinity). Damage caused by hurricanes in New Hanover County can be attributed to:

- (1) Abnormal tidal heights and wave action
- (2) Wind effects on structures
- (3) Excessive rainfall

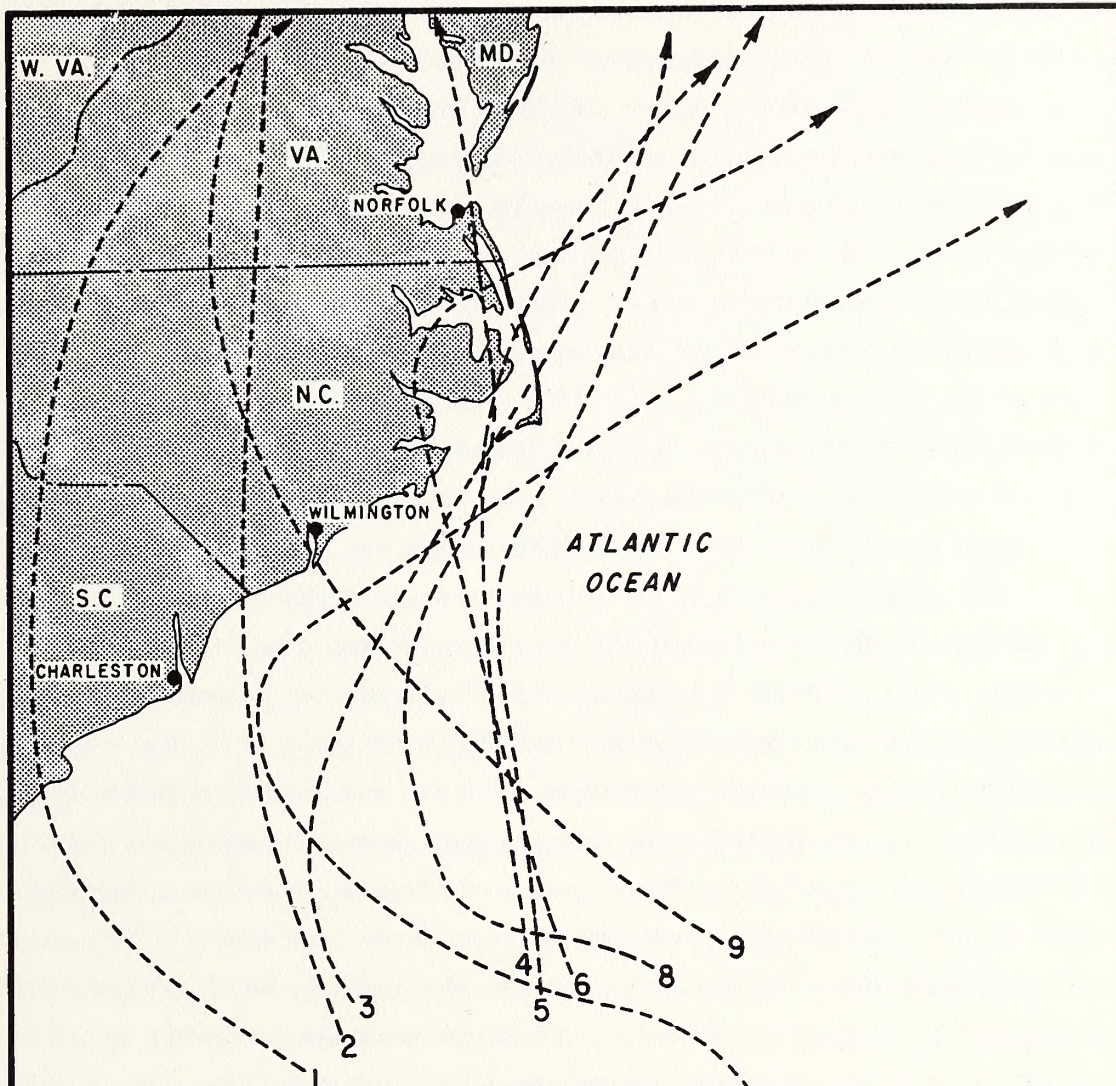
Additional damage caused by hurricanes can be attributed to:

- (1) Inadequate building standards and codes
- (2) Inadequate zoning regulations

The survey report by the Corps of Engineers includes illustrations showing the paths taken by major hurricanes. An adaptation of these illustrations is shown on Map 4 which indicates hurricane paths during the years 1952-1958. While all these hurricanes caused shoreline damage and hastened shoreline erosion, it is of interest to note that Hurricane Hazel (number 2 on Map 4), although centered a considerable distance west of New Hanover County, caused more damage to shoreline property in New Hanover than any other hurricane.

Effect of Climate on Urban Development

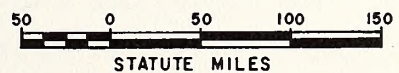
Year round temperatures do not present problems which would inhibit urban development. Summer temperatures are moderated by ocean breezes and are not extreme. Little snow is encountered in New Hanover County and no transportation problems are created due to impassable roads. The two inhibiting factors are precipitation and hurricanes. Although the annual amount of precipitation is not excessive, occasional thunderstorms and heavy rainfall associated with hurricanes produce heavy precipitation in a 24 hour period. Flooding occurs due to lack of adequate natural or man-made drainage systems. The poor drainage characteristics particularly affect low lying lands - inhibiting urban development and creating uncomfortable and unhealthy conditions in developed



MAP NO. 4

1952 - 1958

**PATHS OF TROPICAL HURRICANES
WITHIN 150 MILES OF N.C. COAST***



* SOURCE U.S. CORPS OF ENGINEERS

1 · ABLE	AUG.-SEPT., 1952	6 · IONE	SEPT., 1955
2 · HAZEL	OCT., 1954	7 · HELENE	SEPT., 1958
3 · CAROL	AUG., 1954	8 · CONNIE	AUG., 1955
4 · BARBARA	AUG., 1953	9 · DIANE	AUG., 1955
5 · EDNA	SEPT., 1954		

areas without adequate drainage. Further comments on drainage will be found in Topography and Drainage, following.

Until recently, fear of hurricane damage inhibited substantial investment in urban properties on the beaches of New Hanover County. In the past few years property values have increased tremendously along the sounds and beaches. Residential development of year round housing and vacation-type housing is taking place along the coast. Substantial commercial development is likewise occurring. The construction of a large, modern hotel at Wrightsville Beach testifies to the belief that profitable and safe development of beach areas can and will continue to take place.

The potential for urban development of coastal and estuarine areas is constantly increasing due to increases in leisure time and willingness of workers to commute considerable distances to places of employment. Potential home owners and entrepreneurs should be aware of the potential hazards they face from heavy rains and hurricane damage before investing substantial capital. The Corps of Engineers in cooperation with local units of government has been active in beach erosion control and hurricane protection projects which offer some protection from the effects of tide and wave action. Strengthening of building code requirements and zoning controls will offer more protection to investors in the coastal areas.

Topography and Drainage

New Hanover like many counties in eastern North Carolina is relatively flat. The elevation above sea level ranges from zero feet at the Atlantic Ocean to approximately 60 feet. This latter figure represents the highest elevation measured by the Geodetic Survey Division of the N. C. Department of Conservation and Development. Most of the county lies between the 20 foot and 40 foot contour intervals shown on maps published by the U. S. Geological Survey.

The Geological Survey maps noted above are the only contour maps of the entire county currently available. The maps show 20 foot contour intervals. Consequently, only two contour lines are shown for the county. These maps are of little use for engineering or planning purposes. Contour maps showing two foot intervals are needed due to the presence of large tracts of low lying land. Such maps would be expensive to prepare. The cost of adequate topographic mapping should therefore be spread over a 3-5 year period.

Topography is an inhibiting factor in the urban growth potential of New Hanover County. Natural drainage is inadequate due to the flat characteristics of the terrain. Drainageway maintenance is currently tied to a Health Department program of mosquito eradication and is not sufficient to meet the drainage needs of the county. Residential development has already occurred in low lying areas subject to flooding. Inadequate storm drainage has frequently resulted in damage to property and discomfort to residents. Future residential subdivision development should be permitted only when proof of adequate drainage is presented to the Planning Board. Manufacturing facilities have, and will continue to insure that adequate drainage is provided in order to protect the investment of capital in plants, warehouses and other structures. Low lying areas subject to annual flooding can, and should be utilized for forestry, wildlife and recreation purposes.

SOILS

The soils of New Hanover have been grouped into ten associations by soil scientists of the Soil Conservation Service, U. S. Department of Agriculture. Soil associations are obtained by grouping soil series. A soil association is a landscape that has distinctively proportional patterns of soils. It normally consists of one or more major soils and at least one minor soil, and is named for the major soils. The soils in one association may occur in another, but in a different pattern. The Generalized Soils Map is intended for broad planning purposes only, and is not suitable for individual farm planning or building site locations. This is because of the differences in soil characteristics within an association. These different characteristics such as high water table, drainage, and soil texture affect the use and management of each soil.

Soil interpretations based on the generalized soils map are shown in Table 2. The emphasis of this table is to show limitations for urban development. It will be noticed that only 8 percent of the county has been classified as "good" for general agricultural purposes. The table also reveals that most of the soils present in New Hanover County present moderate to severe limitations for residential development dependent on septic tanks and filter fields for waste disposal.

Effect of Soils on Urban Development

As previously noted, New Hanover County soils present serious limitations to residential development in areas not served by community water and sewer systems. Existing county subdivision regulations require large lot sizes to accommodate septic tanks and wells on the same building lot but a potential health hazard is apparent. High water tables, low filtering action, and serious drainage problems present the possibility of spoiled wells and surface runoff of effluent

in relatively densely populated urban areas. Additional limitations are imposed by such characteristics as poor traffic supporting capacity which increases road building expenditures, differing shrink-swell characteristics which present problems in stabilizing foundations for buildings, and the presence of flood hazards in low-lying areas.

The generalized soils map together with the limitations chart provide a ready reference to soils in New Hanover County.

SOIL INTERPRETATIONS

TABLE 2

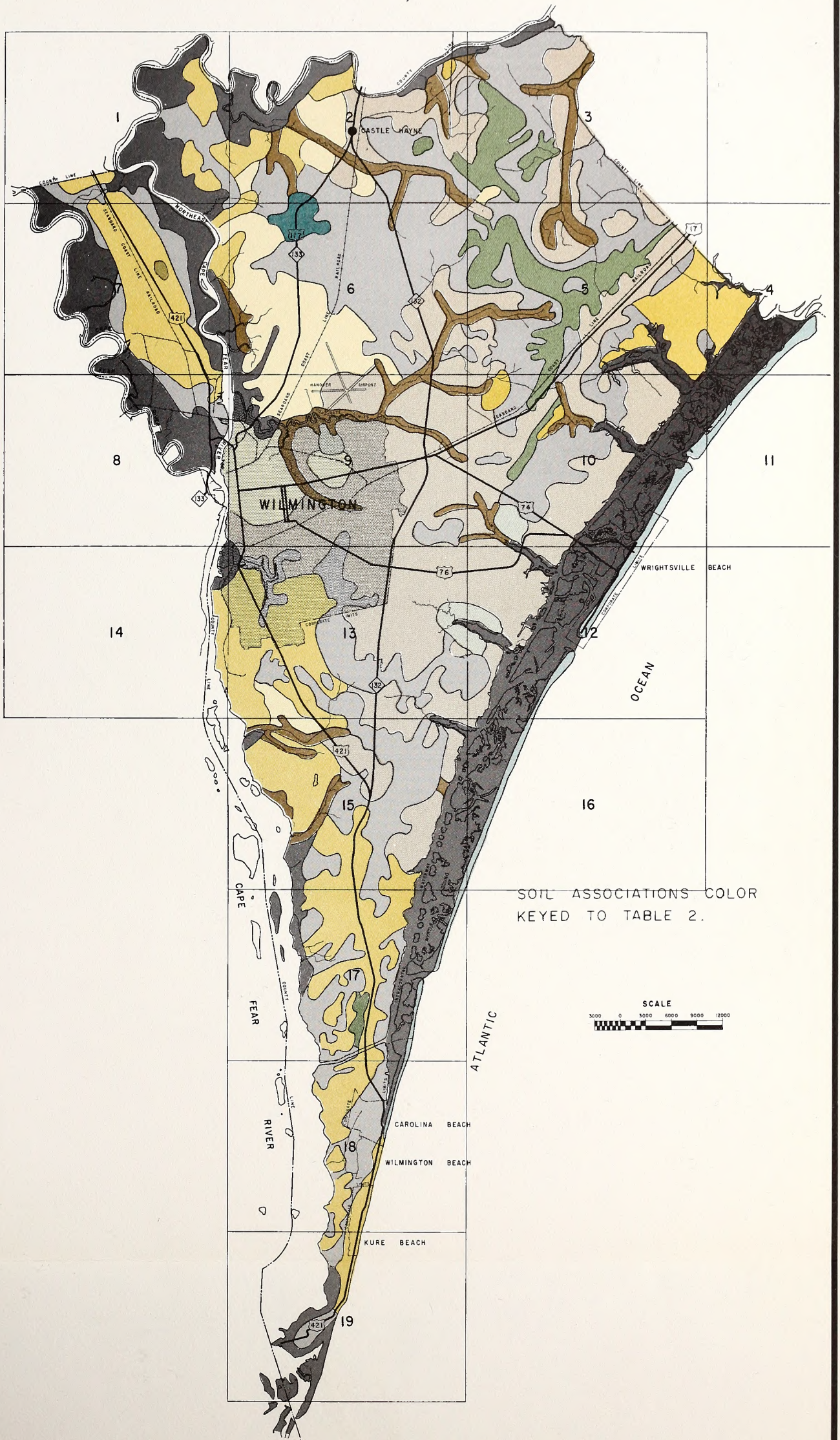
SOIL ASSOCIATIONS		% IN ASSOC.	LIMITATIONS FOR						
			DWELLINGS WITH		RECREATION		LIGHT INDUSTRIES (FOOTINGS IN SUBSOIL)	ROADS AND STREETS (SUBSOIL FOR BASE)	GENERAL AGRICULTURE
			SEWERAGE SYSTEMS	SEPTIC TANK FILLER FIELDS	CAMP SITES	PICNIC AREAS			
GOLDSBORO - LYNCHBURG - DUNBAR (7% OF COUNTY) MODERATELY WELL TO SOMEWHAT POORLY DRAINED SOILS.	GOLDSBORO	45		WT			CO		
	LYNCHBURG	30	WT	WT	WT	WT	WT, CO	WT	
	DUNBAR	15	WT	WT	WT	WT	WT, CO	WT, TS	
LAKELAND - ST. LUCIE - WAGRAM (10% OF COUNTY) WELL TO EXCESSIVELY DRAINED SOILS WITH SAND OR LOAMY SURFACES AND SAND TO SANDY SANDY CLAY LOAM SUBSOIL.	LAKELAND	75	PR, AW	LF, AW, PR	TR, AW, PR	TR, PR, AW			
	ST. LUCIE	10	PR, AW	LF, PR, AW	PR, TR, AW	PR, TR, AW	TS	TS	
	WAGRAM	5					TS	TS	
COASTAL BEACH - DUNE SANDS (1% OF COUNTY) LONG NARROW AREAS OF LEVEL TO MODERATELY SLOPING SANDS CONTAINING EXCESSIVELY DRAINED TO COARSE SAND WITH MARINE LIFE DEPOSITS.	COASTAL BEACH	60	PR, AW	PR, LF	TR	TR	CO, TR	TS	
	DUNE SANDS	40							
CRAVEN (1% OF COUNTY) THREE SMALL LEVEL TO GENTLY SLOPING AREAS WITH SLOW PERCOLATION RATE AND HIGH SHRINK-SWELL POTENTIAL.	CRAVEN	80	SH-SW	PE, SH-SW	TR	TR	SH-SW	TS	
CHIPLEY - LEON - RUTLEGE (20% OF COUNTY) LEVEL TO EXCESSIVELY DRAINED SOILS WITH SAND OR LOAMY SAND SURFACES AND SAND TO SANDY CLAY LOAM SUBSOIL.	CHIPLEY	50	WT	WT	WT, TR	WT, TR	WT		
	LEON	35	WT, PO	WT, PO	TR	TR	PO, CO	WT	
	RUTLEGE	10	PO, WT	PO, WT	PO, TR	PO, TR	PO, WT, CO	PO, WT	
RUTLEGE - CHIPLEY - LEON (40% OF COUNTY) VERY POORLY TO MODERATELY WELL DRAINED LOAMY SANDS AND SANDS, MORE THAN 40" THICK.	RUTLEGE	60	PO, WT	PO, WT	PO, TR	PO, TR	PO, WT, CO	PO, WT	
	CHIPLEY	20	WT, PO	WT, PO	WT, TR	WT, TR	WT		
	LEON	10	WT, PO	WT, PO	TR	TR	PO, CO	WT	
COXVILLE - PORTSMOUTH (1% OF COUNTY) POORLY TO VERY POORLY DRAINED SOILS.	COXVILLE	45	WT, PO	WT, PE, PO	WT, PO	WT, PO	TS, WT, PO	TS, WT, PO	
	PORTSMOUTH	35	WT, PO	WT, PO	WT, PO	WT, PO	WT, PO, CO	WT, PO	
MUCK - POCOMOKE (4% OF COUNTY) VERY POORLY DRAINED SOILS WITH THICK ORGANIC SURFACES UNDERLAIN BY SANDY MATERIAL.	MUCK	40	WT, PO	WT, PO	WT, PO	WT, PO	WT, PO, CO	WT, PO	
	POCOMOKE	60	WT-PO	WT-PO	WT-PO	WT-PO	WT, PO, CO	WT, PO	
BIBB - JOHNSTON (2% OF COUNTY) LONG, NARROW AREAS ALONG STREAMS WHICH ARE SUBJECT TO FLOODING, PONDING, AND OVERFLOW.	BIBB	80	FL, WT	FL, WT	TR, FL	TR, FL	FL, WT, CO	FL, WT	
	JOHNSTON	10	FL, WT	FL, WT	TR, FL	TR, FL	TR, FL	FL, WT	
MARSH - SWAMP (14% OF COUNTY) MIXTURE OF SILTS, CLAYS, AND ORGANIC MATTER SUBJECT TO CONTINUAL FLOODING AND OVERFLOW.	MARSH	80	FL, WT	FL, WT	FL, WT	FL, WT	FL, WT, CO	TS, FL, WT	
	SWAMP	20	(USE OF SOILS IN THIS ASSOC. GEN. LIMITED TO WILDLIFE HABITAT)						

LIMITING FACTORS

- | | |
|---|---|
| FL - FLOOD HAZARD
WT - WATER TABLE
TR - TRAFFICABILITY
SH-SW - SHRINK-SWELL POTENTIAL
PE - PERCOLATION RATE | CO - CORROSION POTENTIAL
TS - TRAFFIC SUPPORTING CAPACITY
PR - PRODUCTIVITY
AW - AVAILABLE WATER CAPACITY
LF - LOW FILTERING ACTION
PO - PONDING |
|---|---|

DEGREES OF LIMITATIONS

- | | |
|--|-------------------|
| | SLIGHT |
| | MODERATE |
| | SEVERE TO EXTREME |



CHAPTER TWO
EXISTING LAND USE PATTERNS



Population Trends

There are 4 incorporated communities in the 5 townships of New Hanover County. It is apparent that rapid urbanization has taken place and is continuing to occur. Census of Population statistics, estimates of current population, and population projections by the Division of Community Planning are presented below in Table 3 to indicate growth trends.

TABLE 3*
POPULATION GROWTH

<u>DATE</u>	<u>CITY OF WILMINGTON</u>	<u>NEW HANOVER COUNTY</u>
1940 ^{1/}	33,407	47,935
1950 ^{1/}	45,043	63,272
1960 ^{1/}	44,013	71,742
1965 ^{2/}	54,600	75,657
1970 ^{3/}	59,679	79,572
1980 ^{3/}	75,000	100,000
1985 ^{3/}	82,500	110,000

^{1/}Census of Population, 1960.

^{2/}Estimate - Division of Community Planning.

^{3/}Projection - Division of Community Planning.

*See Appendix for explanation of population estimates.

Residential Development

Residential growth has been especially heavy to the north and east of Wilmington and in the beach areas. This growth has resulted from expansion of existing industry and the addition of new industries to Wilmington and New Hanover County during the past five years. The creation of additional employment opportunities has attracted residents from other areas and decreased outmigration. The demand for housing is heavy and subdivision development is taking place in

response to the demand. Records of the Wilmington-New Hanover Planning Department show that five subdivision preliminary plats were approved in 1966 and 11 were approved in 1967. Most of these plat approvals were in areas outside the City of Wilmington. Extensive land areas are available for future residential development. As previously noted, however, problems may be anticipated due to soil characteristics and topography.

Commercial Development

The City of Wilmington is the center of commerce for New Hanover County and the seven adjacent counties of Onslow, Duplin, Pender, Brunswick, Bladen, Columbus, and Sampson. Commercial development outside incorporated communities has expanded in areas adjacent to suburban residential development. Unfortunately, commercial development consists mainly of strip development along heavily travelled arteries. This type of development causes congestion and in some areas increases blighting factors as former residences are converted to commercial use or abandoned. U. S. 17 north of Wilmington is an example of strip commercial development. Commercial development extends along this highway all the way to Pender County. This is due to the fact that a heavy amount of tourist traffic travels along this particular highway.

There are four shopping centers in New Hanover County and it is anticipated that other centers and large discount type stores will be built to the east and south of Wilmington.

Industrial Development

The industrial sector of the economy has experienced substantial growth in the past ten years. Port oriented industry, storage, and warehousing activities, have all experienced growth and modernization. The Cape Fear and Northeast Cape Fear Rivers offer excellent industrial sites

to industries desiring bulk shipments by barge or ocean freighters. Rail facilities are available close to the east bank to the Cape Fear and to the west bank of the Northeast Cape Fear Rivers. Recently, industrial development has taken place on both sides of the Northeast Cape Fear. The Committee of 100, an industrial development group in New Hanover County, has been successful in its efforts to attract industry to the area. Labor markets in adjoining counties are helping to provide a suitable labor force for new industries locating in New Hanover. The recent introduction of major industrial plants into the area (General Electric, Hercules, DuPont) offers incentive to smaller industries providing goods and services to the large corporations to locate in the area. Large tracts of land are available as future industrial sites in New Hanover County adjacent to the Cape Fear River, railroad lines, and major highways.

Agriculture and Forestry

New Hanover County contains approximately 124,160 acres of land area. The N. C. Department of Agriculture, Crop Reporting Service, estimates that in 1966, 22,304 acres was devoted to farmland uses. A breakdown of farmland uses in 1966 is shown below in Table 4.

TABLE 4
FARMLAND USES, NEW HANOVER COUNTY, 1965-1966

<u>USE</u>	<u>ACRES</u>	
	<u>1965</u>	<u>1966</u>
Harvested cropland	4,015	3,939
Idle cropland	3,645	3,435
Improved pasture	1,212	652
Unimproved open pasture	658	552
Woodlands and all other	<u>13,075</u>	<u>13,706</u>
All land in farms	22,605	22,304

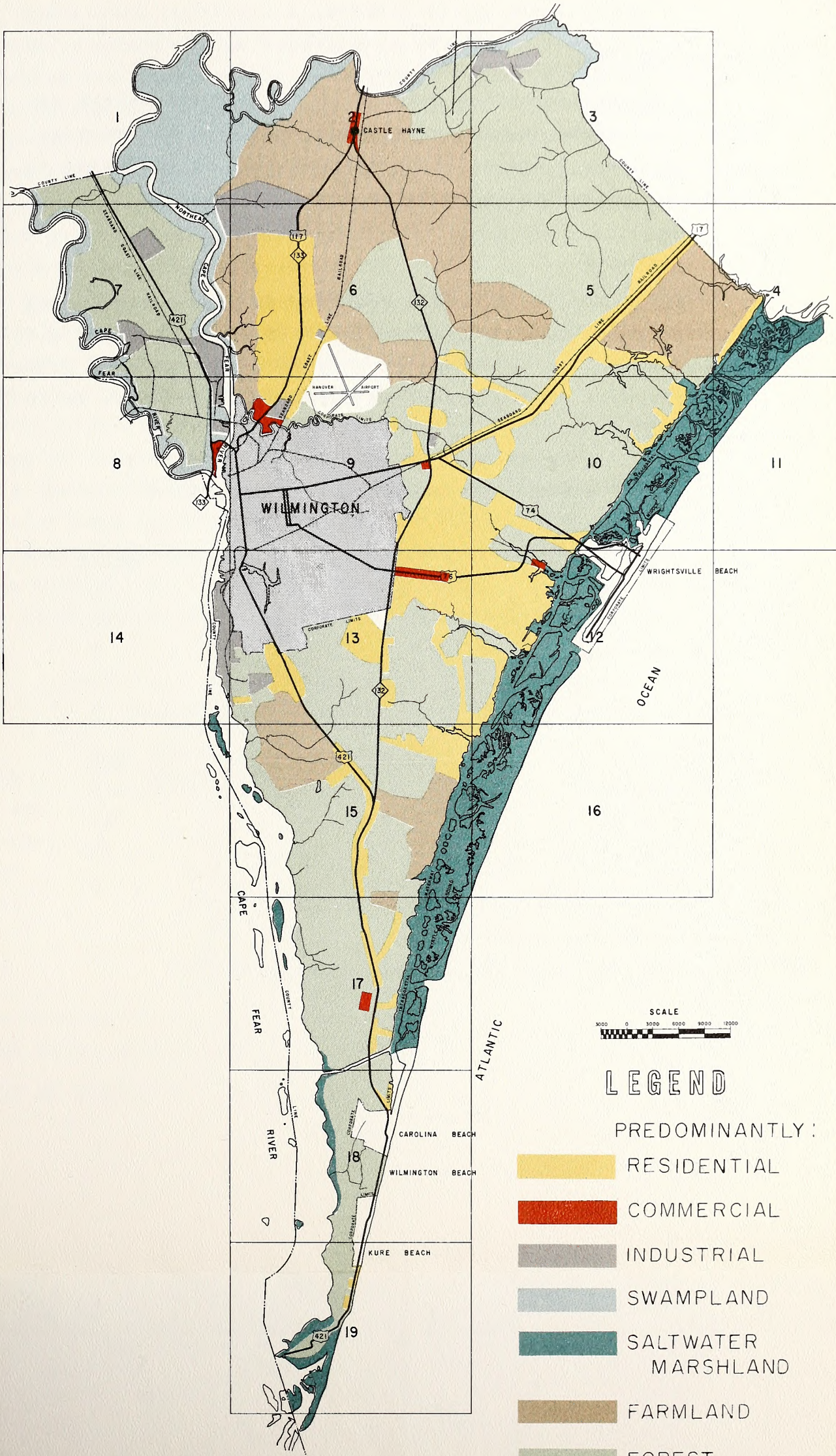
The number of people living on farm tracts decreased 5 percent between 1966 and 1967 from 1,463 to 1,395. Of this figure 362 people worked more than 100 days off the farm during 1966. Since the definition of farm tract used in the 1967 Township Farm Census includes any tract of land of five or more acres it is reasonable to assume that many of these tracts cannot be considered as farms in a general sense. A recent publication of the New Hanover County Extension Service indicates the rural farm population numbers only 354 persons.^{1/}

The number of farmers and acres of land devoted to farming has declined steadily during the past ten years due to the increasing demand for urban utilization of land. The increasing value of land caused by urban pressures is creating land values too high to warrant continued agricultural production. Flower growing, vegetable production, and nurseries are currently the most profitable agricultural enterprises.

According to the 1960 Forest Service Survey, there are approximately 76,000 acres of commercial forest land in New Hanover County. The Division of Forestry, N. C. Department of Conservation and Development, estimates that by 1967 this acreage has been reduced to 55-60,000 acres. The principal species growing in the county are pond pine in the lower, wet areas, mixed hardwoods with cypress in the stream drains, loblolly pine on the better soil types, and longleaf pine on the dry, sandy ridges. The great majority of forest land in New Hanover County is controlled by six corporations.

Existing generalized land use patterns are shown on Map 6. The Wilmington-New Hanover Planning Department has prepared more detailed land use maps of the unincorporated areas of the county at a scale of 1 inch = 800 feet. A total of 19 maps have been prepared at this scale. Uses of land have been coded on these maps utilizing the Standard Land Use Coding Manual of the Department of Commerce, Bureau of Public Roads, 1965.

^{1/}Target 2, New Hanover County Agricultural Extension Service, 1966.



LEGEND

PREDOMINANTLY :

- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- SWAMPLAND
- SALTWATER MARSHLAND
- FARMLAND
- FOREST

Transportation

The transportation network of New Hanover County encompasses highways, railways, waterways, and air routes. Each of these transportation systems will be discussed in terms of their impact on urban development.

Highways

As of January 1, 1967, New Hanover County (including incorporated areas) had a total of 315 miles of state maintained roads. A breakdown of this road mileage into primary and secondary roads, paved and unpaved, is shown in Table 5.

TABLE 5
HIGHWAY MILEAGE, NEW HANOVER COUNTY^{1/}
STATE MAINTAINED

<u>Type</u>	<u>Miles</u>
Primary	<u>86</u>
Paved Rural	65
Unpaved Rural	0
Paved Municipal	21
Unpaved Municipal	0
Secondary	<u>229</u>
Paved Rural	175
Unpaved Rural	27
Paved Municipal	25
Unpaved Municipal	2

^{1/}Source: N. C. State Highway Commission.

Additional roads are constantly being added to the existing network as new subdivision roads and streets are dedicated and accepted for maintenance by incorporated communities and the State Highway Commission. The Wilmington-New Hanover Planning Board examines subdivision plats to insure that all new streets are planned to facilitate the most advantageous development of the entire neighboring area and to provide for the continuation of existing principal streets in surrounding areas.

Major U. S. highways (421, 17, 117, 74, and 76) afford access into the county and provide adequate north-south and east-west intracounty transportation corridors. N. C. 132 is also an important north-south county highway which runs between Carolina Beach and Castle Hayne. U. S. 421 terminating at Federal Point (Fort Fisher) is complemented by state operated ferry service to Southport. During 1967, 16,257 vehicles used the ferry. Comparative figures are not available since 1967 was the first full year of ferry operation. Table 6 shows the frequency of ferry usage. It is anticipated that this service will increase in popularity and usage.

TABLE 6
SOUTHPORT-FORT FISHER FERRY, 1967

<u>Month</u>	<u>Vehicles Carried</u>	<u>Month</u>	<u>Vehicles Carried</u>
January	144	July	4,831
February	170	August	4,522
March	470	September	1,492
April	99 ^{1/}	October	1,057
May	550 ^{1/}	November	0 ^{2/}
June	2,922	December	0 ^{2/}

^{1/} Out of service - April 7 to May 18.

^{2/} Out of service all month.

One of the biggest problems of the highway network within the county is that most of the major highways go through downtown Wilmington. Traffic congestion creates serious problems during peak hours subjecting county residents, tourists, and through traffic to delays. The Cape Fear River Bridge constitutes a bottleneck for all westbound and some northbound traffic. Some relief will be provided when the new Cape Fear Bridge is completed to the south of the existing structure. Completion of the new \$16 million bridge is scheduled for May, 1969. While the new bridge will divert traffic from the central business district of Wilmington it will still channel all through traffic into a densely populated area of the city.

A technical coordinating committee has been appointed to prepare a thoroughfare plan for the City of Wilmington. A planning consultant will be selected in the near future to prepare a long range comprehensive thoroughfare plan for Wilmington and the surrounding urbanizing area.

The underlying concept of the thoroughfare plan is that it provides a functional system of streets which permits travel from origins to destinations with directness, ease, and safety. Different streets in the system are designed and called on to perform specific functions, thus minimizing the traffic and land service conflict.

Much discussion has centered, in recent years, on the need for a four lane highway serving New Hanover County to the west and north. Historically, the provision of four lane highways has been determined by traffic volumes. Evidence must be submitted to indicate that existing highways are overcrowded or traffic count projections must indicate that overcrowding will occur in X number of years before additional lanes can be considered. The situation in New Hanover County is such that these criteria may not necessarily apply. The two major traffic generators are (1) port facilities and (2) recreation areas. The potential growth of these traffic generators will be inhibited unless adequate transportation corridors can be provided to the industrial Piedmont section

of North Carolina. If multiple lane highways provide rapid access from Piedmont North Carolina to port facilities at Charleston, S. C., and to recreation resorts in the vicinity of Myrtle Beach, S. C., then it is reasonable to assume that traffic to those areas will increase at the expense of facilities located in New Hanover County.

The development of Eastern North Carolina is dependent, to a large extent, upon the provision of good roads to the remainder of the State. The situation is somewhat similar to the development of the Western States after 1865. Railroads were extended west in the hope of creating new settlements as much as they were designed to serve existing settlements. While the analogy refers to a different form of transportation the basic premise is similar - provision of transportation corridors will spur development.

Rail

New Hanover County is served by the Seaboard Coastline Railroad. The major tracks parallel U. S. 17, 117, and 421 north from Wilmington and U. S. 74 west from Wilmington. Storage yards in the Wilmington area have a capacity in excess of 2,500 freight cars which provide adequate facilities for storing cars needed for moving freight from the Port of Wilmington. Spur lines serve major industries in New Hanover County. Industrial sites are available adjacent to railroad tracks creating additional incentives for the location of new industrial plants. Passenger service is limited to one round trip daily between Wilmington and Rocky Mount, N. C. where connections are made to other points on the Seaboard Coastline system.

Air

New Hanover County Airport (Bluethenthal Field) is located on an 1800 acre tract north of Smith Creek which is the northern extremity of the City of Wilmington. The airport is served by Piedmont Airlines which currently operates 15 flights daily. Direct flights are available to New York, Atlanta, Washington, D. C., and Charlotte. Three runways, 8,000 feet, 7,000 feet, and 4,100 feet are provided for air traffic. Improvements to runways, runway lights, and the terminal building are needed in order to facilitate use of the airport by jet transports, and to accommodate the increasing number of passengers using the terminal building.

The airport offers incentives to industries in that executives and service personnel can reach the New Hanover area with minimum delays. The physical location inhibits residential growth to the north of Wilmington due to aircraft noise and FAA restrictions along flight approach paths. Light industries utilizing air freight should be encouraged to locate in the general area around the airport, but not in the approach zones. Residential development should be discouraged and population densities should be held to a minimum in the immediate vicinity of the airport and along the flight approach paths.

Water

The Cape Fear River and the Intracoastal Waterway provide access to the Port of Wilmington. The U. S. Corps of Engineers describes the Port of Wilmington as follows: "It includes both banks of the Cape Fear River from a point about 18 miles below the foot of Castle Street in Wilmington to a point about 2 miles above the railroad bridge at Navassa, and both banks of the Northeast Cape Fear River from its mouth to a point about 1.25 miles above the Railroad Bridge

at Hilton."^{1/} The ship channel from Wilmington to the ocean bar is currently being deepened to a depth of 38 feet. Above Wilmington an 8 foot channel is maintained up the Cape Fear River to Fayetteville, 115 miles above Wilmington.

The North Carolina State Ports Authority operates a large terminal south of Wilmington which has experienced rapid growth. Four hundred fifty to 500 ocean going ships use the State Port Terminal each year. During 1966, 894 ships (over 12 feet draft) entered Wilmington Harbor. This figure does not include the movement of tugs, barges, and other small craft. In addition to the N. C. Ports Authority Terminal, the Greater Wilmington Chamber of Commerce lists 37 private docking facilities in the Port of Wilmington.^{2/}

The economic impact of the Port of Wilmington upon the city and county is obvious. Several thousand jobs are directly or indirectly related to the port. Stevedores, warehousemen, freight handlers, etc., are directly connected to the port economy, but importers, exporters, expeditors, brokers, and other services and industries locate in the Wilmington area because of the port. Large volumes of freight are moved by rail and motor carrier from the port creating additional opportunities for employment and investment. The North Carolina State Ports Authority estimates that over 16,000 trucks entered the Ports Authority facility in 1967. Petroleum haulers and truck lines further increase truck traffic in the Port of Wilmington.

Continued growth of the Port of Wilmington will increase the need for riverfront properties in New Hanover County for shipping and industrial sites. The entire riverbank has

^{1/}Source: The Port of Wilmington, U. S. Corps of Engineers, Port Series No. 12, 1960.

^{2/}Source: The Port of Wilmington, N. C., Port and International Trade Facilities, Greater Wilmington Chamber of Commerce, 1967.

tremendous potential for industrial development. Additional potential would exist for industrial port sites along the Northeast Cape Fear River to Castle Hayne if the channel could be deepened to accommodate ocean going ships.

The Intracoastal Waterway offers impetus for residential growth, both for permanent and vacation homes. Constantly increasing interest in water oriented recreation activities creates urban residential potential for the entire distance of the waterway in New Hanover County. The bulk of barge traffic utilizing the waterway is classified as "through" traffic and has little effect on New Hanover County's economy. Barge traffic is not so heavy as to detract from the pleasant vistas and water access that creates potential for residential development along the Intracoastal Waterway.

Utilities

Water for the Wilmington area is piped from the Cape Fear River at King's Bluff, twenty-one miles west of the city. The raw water supply available at King's Bluff is estimated to be at least 1,000 times greater than the peak daily usage in Wilmington. Water is distributed to all areas within the city limits and to some suburban developments and industries located outside the city limits. The incorporated towns of Wrightsville Beach, Carolina Beach, and Kure Beach rely on deep wells to supply community water. With the exception of a small number of community systems in some residential subdivisions the remainder of the county depends on individual wells. No sewerage systems are provided outside incorporated communities. The rural population depends on septic tanks for waste disposal. Natural gas is available in Wilmington while electric power and telephone service are provided in the county by Carolina Power and Light Company and the Southern Bell Telephone Company respectively.

Preceding sections of this report have outlined limitations imposed on urban development by the lack of adequate

water and sewerage systems outside incorporated areas of New Hanover County. The provision of county-wide water and sewerage systems would add immeasurably to urban potentials of the county. Residential development could take place at much greater densities than presently permitted. Large industrial water users would normally be expected to provide their own water systems since it would be economically feasible for them to do so. Smaller industries, not dependent on large quantities of water, would be encouraged to locate in various sections of the county if water and sewerage could be made available. Many industrial development authorities now feel that an industrial site cannot be designated as such unless water and sewer service lines are either installed or readily available. A feasibility study should be made to determine those areas of New Hanover County that could profitably support, and most urgently need, access to a community water and/or sewerage system. Staged development of such facilities would seem to be indicated due to the cost of undertaking such a project.

Community Facilities

The availability of community facilities can do much to attract tourists, new residents, and encourage retention of population. To a lesser extent, industrial prospects are interested in the community facilities and cultural offerings of a community. Management personnel and skilled technicians not only desire good employment opportunities, but desire these opportunities in locations compatible with their leisure time interests and activities. Good schools, roads, adequate utilities, police, fire, and health protection are expected from local government. Thus, the cultural activities and community services provided by local and state government, and additionally made available due to the physical characteristics of the area, are important attributes of New Hanover County's potential.

The major community services and cultural offerings of New Hanover County are inventoried below.

Schools

The New Hanover County Public School system serves the entire county including the City of Wilmington, Wrightsville Beach, and Carolina Beach. In the 1967-1968 school year New Hanover County had 21 elementary schools, four junior high schools and three senior high schools. Wilmington College with approximately 1,200 students offers undergraduate degrees in several areas of studies. Cape Fear Technical Institute provides trade and technical training for residents of the area. A private business college offers commercial, business, and secretarial courses.

Historic Sites

The U. S. S. North Carolina located on the Cape Fear River at Wilmington, is owned by the State and serves as a memorial to North Carolinians killed in World War II. The battleship is open to the public and is a major tourist attraction.

Fort Fisher was the largest Civil War earthwork fortification in the Confederacy. The State Department of Archives and History has erected a visitor center-museum at the site. The State owns approximately 20 acres of land and is negotiating for purchase of an additional 20 acres. An additional 185 acres along the Cape Fear River is leased from the federal government. This leased land contains approximately one-half of the visible remains of Fort Fisher and the land once occupied by Fort Buchanan.

The historic area of Wilmington contains many buildings of both architectural and historic significance. The formal creation of a historic district will help to preserve the character and significance of the area.

The Blockade Runner Museum offers a historical presentation of blockade running on the lower Cape Fear River during the Civil War. Numerous artifacts dating back to this period are available for inspection. The museum is privately owned and an entrance fee is charged.

The Wilmington-New Hanover Museum located in Wilmington maintains an extensive collection of African weapons, basketry and costumes. This museum is free to the public.

Gardens and Parks

Greenfield Gardens, operated by the City of Wilmington, offers a five mile scenic drive around a 125 acre lake. This nationally recognized park is noted for its azaleas, but it also has thousands of other species of shrubs, plants, and native trees. Additional features include picnic areas, kiddie zoo, amusement park, boat rides, and an amphitheatre.

Airlie Gardens is a private garden with an entrance fee charged. These gardens encompass 155 acres specializing in azaleas, camellias, and rare evergreens.

Golfing

New Hanover possesses three golf courses, all in the Wilmington area. One of the courses is municipally owned while two are private clubs available to visitors.

Beach Oriented Recreation

Swimming, sunbathing and fishing constitute the major activities along the coastline portion of New Hanover County. Motels, cabins, and vacation homes are clustered around the major beach communities of Wrightsville, Carolina and Kure. Marinas and boat docks serve as the starting point for numerous charter fishing boats. Six fishing piers are used extensively and surf casting can be observed along the beach areas. The beach areas offer increasing potential for commercial development. Tourism is a major "industry" in New

Hanover County and adequate facilities must be provided to accommodate the increasing influx of tourists to New Hanover County. Private capital is responding to the demand as evidenced by the construction of new and expanded facilities such as a \$500,000 addition to the Blockade Runner Motor Hotel in Wrightsville Beach and the construction of a 150 room Voyager Inn Motel on the Cape Fear waterfront in downtown Wilmington.

Local government has a responsibility to encourage desirable growth patterns in these areas through the utilization of zoning ordinances, subdivision regulations, building codes, and housing codes. Haphazard development, construction of substandard dwellings on undersized lots and the proliferation of uncoordinated commercial activities will erode the potential of beach areas unless land controls are imposed by units of government. Rapid and continued development will benefit municipalities and the county in the form of taxable property. However, the end result might well be a conglomeration of mediocrity sufficient to discourage the tourist and the potential year round resident unless local government officials institute and enforce adequate zoning controls and building codes.

CHAPTER THREE

LAND POTENTIAL SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

For well over 100 years, the railroad industry provided impetus for growth and employment in New Hanover County. At one time the Wilmington and Weldon Railroad was the longest railroad line in the world. In more recent years the general offices and shops of the Atlantic Coast Line Railroad were located in Wilmington. The decision to move headquarters of the railroad from Wilmington to Jacksonville, Florida, in 1961 caused considerable anxiety. Some employees left New Hanover County, bound for Florida, while those unable or unwilling to move were plagued with insecurity. The population of Wilmington declined between 1950 and 1960, while the county's population increase was not as rapid between 1950 and 1960 as it was during the previous decade.

Faced with the loss of a major industry, New Hanover County was forced to seek additional industries to provide employment. Industrial diversification has been sought by public and private interests and the challenge has been met. Today, New Hanover County looks with pride at its diversified economy, its growing cultural attractions, and the increasing popularity of its beaches. The potential for growth has been visibly demonstrated. In 1967, impressive industrial gains were registered as evidenced by announcements from General Electric Corporation, Roll Form Products, Hercules, Timme Corporation, Duetch Filters, Inc., and others. Commercial expansion and new construction was also announced. The impact of these announcements was felt by the housing market. Residential construction has been taking place at an unprecedented rate.

The problem facing the county in 1968 is one of providing an attractive environment and adequate public services to a rapidly urbanizing area. The detailed recommendations for accomplishing these goals will be outlined in a Development Plan for New Hanover County to be prepared by the Wilmington-New Hanover Planning Department. The following paragraphs summarize the physical and cultural elements that provide

potential or limit the prospects for urban growth in the county. Conclusions drawn from the data are presented along with recommendations. A land potential map is presented as a graphic guide to the text.

Residential Potential

Population projections shown in Table 3 indicate that an increase of approximately 34,000 persons may be anticipated in New Hanover County during the period 1965-1985. Assuming a housing density of 5 units per acre and a dwelling unit occupancy of 3.5 persons per unit, the potential residential land acreage needed will be approximately 1,955 acres. While there is a great amount of vacant land available in New Hanover County, much of it is unsuitable for medium density residential development due to unsuitable topography, poor drainage, and soils unsuitable for individual wells and septic tanks. (See Generalized Soils Map and Soils Limitation Chart pages and). Other areas are a considerable distance from existing population centers, commercial areas and areas where industrial employment is available or anticipated. Beach areas are generally not suited for dense residential development due to the dangers of flooding and periodic threats posed by hurricanes.

Residential development outside incorporated areas cannot take place at a density greater than three dwelling units per acre unless community water and sewerage systems are made available. The greatest potential for residential areas lies east of Wilmington, and to the west of the Intracoastal Waterway; south of Wilmington and east of the Cape Fear River; and north of Wilmington to Castle Hayne, but considerably east of the Northeast Cape Fear River. As previously noted, density of housing will depend upon the availability of community water and sewerage systems.

Industrial Potential

The criteria for industrial sites is remarkably similar to those qualities that make land desirable for residential development. Consequently, industrial developers and residential developers often compete for ownership of a particular tract of land. The Division of Commerce and Industry, North Carolina Department of Conservation and Development, lists the following generally accepted criteria for industrial sites of sizeable acreage:

1. Reasonable and economical in cost.
2. Attractive surroundings.
3. Require minimum amount of grading and clearing.
4. Zoned for protection from encroachment and for specified types of industry.
5. No objectionable easements.
6. Good building foundation characteristics.
7. Highway in front of property.
8. Rail line or spur track in rear.
9. Provision of adequate utilities; water, sewerage, natural gas, electric power.

The above listing constitutes an ideal situation. There are few existing sizeable industrial sites in the State of North Carolina that could meet all the criteria, but New Hanover County possesses tracts that meet many of the requirements and offer the additional incentive of availability of water-borne transportation. The main drawbacks are once more the lack of public water and sewerage systems. While large industrial plants normally need access to railroad spur lines, smaller industrial facilities, generally classified as "light industry" can usually operate away from sites with rail facilities. It is further assumed that land acreage needed by light industry will not be as extensive as that desired by large, heavy industries. The map therefore shows potential industrial areas in two classifications - heavy industry, and light industry. Major areas with industrial potential are

located: north of Wilmington on both sides of U. S. 421 between the Cape Fear River and the Northeast Cape Fear River; and west of N. C. 132 in the vicinity of New Hanover County Airport.

Commercial Potential

Commercial growth in any area is dependent on population growth. According to projected population increases previously cited, substantial commercial growth is anticipated during the next 20 years. Potential sites for shopping centers are difficult to pinpoint since the location of such sites requires detailed economic survey data, a comprehensive knowledge of customer buying habits, a knowledge of future thoroughfare locations, as well as other data. Shopping centers are increasing in number all across the country because of the distribution of population across wider areas. In many respects, shopping centers are an improvement over the older "downtown" business district. Parking problems have been eased, if not solved, and the mixed uses of land have been eliminated to a large degree.

In New Hanover, there is increasing potential for two types of shopping centers; the neighborhood center, and the community center. The neighborhood center concentrates on convenience goods such as foods, drugs, and personal service. This center is usually from 5-10 acres in area and the focal point is usually a supermarket. The trade area required for successful operation should contain a minimum of 1,000 families and the service area should be about 1-1½ mile radius. The community shopping center is an expanded version of the neighborhood center in that clothing stores (soft goods), hardware stores, appliance sales stores (hard goods) are added to convenience shopping outlets. A variety store or "junior" department store provides the focal point. The site is usually from 10-30 acres in area and the trade area requires a minimum of 5,000 families for successful operation. The

service area of a community shopping center is normally about four miles.^{1/}

Due to the complexity of determining commercial areas, several alternate locations are shown on the Land Potential Map. Strip commercial development will also develop along major highways unless adequate zoning controls are enforced. Highway oriented commercial activities are to be expected; especially those activities requiring substantial acreage such as auto dealers, used car lots, etc. In summation, it is expected that commercial growth will occur in the outlying areas of Wilmington accessible from residential subdivisions and close to the intersections of major transportation corridors.

Commercial Recreation Potential

Commercial recreation activities and tourism have a major impact on the county's economy. Between 1954 and 1956 expenditures for lodging, eating, and recreation in North Carolina increased annually by 7.7 percent.^{2/} It is estimated local and traveling customers share of sales and receipts of travel related business firms in New Hanover County amounted to over \$24,000,000 in 1966.^{3/} These estimates give some idea of the importance of recreation and tourism to the economy. Water oriented activities, amusements, gardens, historical sites, and other features provide an incentive for tourists to spend time and money in New Hanover County, thus providing a potential for commercialized recreation facilities such as hotels, motels, restaurants, and commercial amusement areas.

^{1/} Source: Local Planning Administration, ICMA, Chicago, 1959.

^{2/} Source: Copeland, Lewis, C., North Carolina Travel Survey, 1966, Travel Council of N. C.

^{3/} Source: Ibid.

Motels and hotels will experience the highest potential in waterfront areas, competing with the vacation home builder for ownership of the land. Commercial amusement areas are also located adjacent to waterfront areas (e.g. Carolina Beach). The demand for waterfront property is high and conflicting potentials are apparent. Future Land Development Plans should strive to determine the optimum location of these different land uses. Local governments should encourage compliance with the Development Plan by enacting zoning ordinances and building codes to control land use.

Recreation Potential

New Hanover County possesses large areas of land which has high recreation potential. The commercial aspect of recreation potential has already been discussed, but recreation potential of a more passive nature must be considered for the benefit of New Hanover County residents. Ocean waterfrontage sites are desirable for passive as well as active recreation activities. These activities are normally "unorganized", such as fishing and shell collecting. The Intracoastal Waterway has excellent potential for picnic areas, boat ramps for small pleasure craft, and scenic overlooks. The same potential is present along the Cape Fear and Northeast Cape Fear Rivers. In the northern end of the county, the "relatively" clean river can serve as a recreation area for watersports activities such as fresh water fishing, boating, and skiing. Several areas have potential for creating county parks, overlooks, and trails along the riverbank. Periodic flooding of these areas creates a high potential for recreation use as opposed to residential use.

It is extremely important that natural features offering recreation potential should be preserved and made available to New Hanover County residents as well as to visitors. The Atlantic Coast beaches, the Intracoastal Waterway, and the Cape Fear River have been subjected to undesirable private

development in some areas thus reducing recreation potential. While this report is cognizant of the rights of property owners it is also concerned that very little river frontage and beach frontage remains in public hands for use by the public. State and local governments should attempt to purchase or lease areas for recreation purposes.

One of the more encouraging developments increasing recreational potential in the county is the recent action of the North Carolina Board of Conservation and Development to recommend land purchase and securing of leases to develop a State Park in the vicinity of Snow's Cut (Intracoastal Waterway) between the coast and the Cape Fear River. Funds for this project will be sought from the North Carolina General Assembly in 1969. Additional recreation potential exists along the east bank of the Cape Fear south of Snow's Cut. The potential here is that of a passive nature (parks, overlooks, etc.) since Corps of Engineer restrictions prohibit the erection of structures in this area due to the proximity of Sunny Point Army Terminal.

Agricultural and Forest Potential

The potential for agricultural activities will continue to decline as urban pressures create rising land prices. Return on investment in agricultural enterprises will decrease and all but the most enterprising farmers will discontinue operations. Agricultural potential appears to be in the field of horticulture. Nurseries can find a ready market for their product in the area and to other parts of North and South Carolina. The cut flower market may offer increasing potential if a better marketing system can be devised by local growers. Prime agricultural land in the Castle Hayne area appears to offer the most potential for agricultural endeavors.

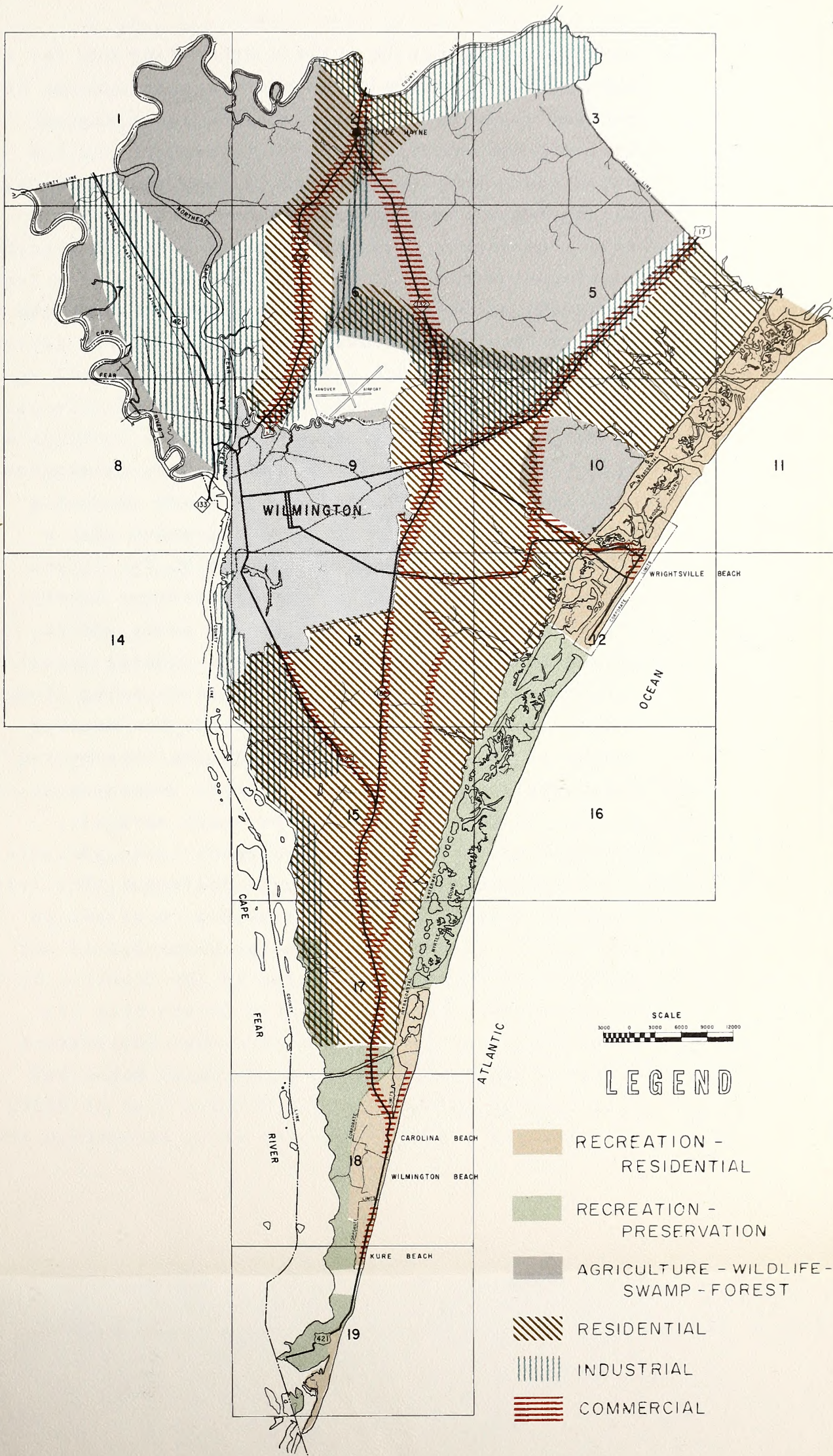
Most of the forest land in New Hanover County is in the hands of land developers and forest products concerns. Such

forest land that is adjacent to areas of present development will undoubtedly become urban in character during the next 5-10 years. Forest land in the more remote areas of the county, especially in the low lying areas will continue to offer potential as commercial forests serving the pulp and paper industry. These areas are shown on the Land Potential Map.

RECOMMENDATIONS

1. Request the U. S. Department of Agriculture, Soil Conservation Service, to perform a Medium Intensity Soil Survey of New Hanover County. This survey would make soil delineations down to areas of one acre over the entire county. This soil survey would provide the following information:
 - A. Permeability or infiltration rate
 - B. Drainage conditions - surface and subsurface
 - C. Seepage capacity - area required for sewage seepage or disposal
 - D. Stress bearing characteristics - depth required for foundations of all types
 - E. Slope and erosion condition
 - F. Compaction information
 - G. Other soil investigations as required

The soil survey information will be extremely useful to the Planning Board, public and private engineers, and numerous other agencies. Soil data is essential to the construction and design of drainage systems, planned real estate development, industrial site development, and sewage disposal plant design. This type of soil survey would cost approximately \$30,000. The county's share of the cost would be approximately \$10,000 over a three-year period.



LEGEND

- RECREATION - RESIDENTIAL
- RECREATION - PRESERVATION
- AGRICULTURE - WILDLIFE - SWAMP - FOREST
- RESIDENTIAL
- INDUSTRIAL
- COMMERCIAL

2. New Hanover County is rapidly urbanizing but for the most part, community water and sewerage systems are not available to residents outside incorporated areas of the county. The combination of shallow wells and septic tanks on small lots (under 20,000 square feet) should be considered as temporary solutions rather than permanent features in suburban housing developments. Discussions with soil scientists and environmental health authorities at the State level indicate that county-wide water and/or sewerage facilities are needed now. Further delay will aggravate conditions already critical in certain areas of the county. The Planning Commission commends a recent decision (February, 1968) of the Wilmington City Council and the New Hanover Board of County Commissioners to enter into an agreement with a firm of consulting engineers to study the future water needs of Wilmington and New Hanover County. The Planning Commission feels that every effort should be made to effectuate a county-wide water system based upon results of the forthcoming study.
3. One of the most pressing problems in New Hanover County is the lack of an adequate drainage system. Extensive temporary flooding occurs in many sections of the county after periods of heavy rainfall. Residential development has already taken place in low-lying areas with inadequate drainage. The local mosquito control program has helped to alleviate some of the county's drainage problems but is not designed to eliminate flooding in the county. It is recommended that New Hanover County take the necessary steps to create a Watershed Improvement District under provisions of the Small Watershed Act, Chapter 781 of the 1959 Session Laws of North Carolina and the Watershed and Flood Prevention Act

(Public Law 566). This project would be planned and carried out jointly by local, State, and Federal agencies. A watershed project in New Hanover County would be primarily concerned with drainage but would also involve agricultural water management; community and industrial water supply; recreation and fish and wildlife development. Cost of the project would be shared by Federal and local government. Maintenance costs would be borne by local government.

4. Request the Department of the Army, Corps of Engineers, to prepare a detailed floodplain information study of the Cape Fear River and Northeast Cape Fear River in New Hanover County. This study would provide a basis for floodplain zoning in Wilmington and New Hanover County.
5. Amend the county subdivision regulations to permit the Planning Commission to require the inclusion of topographic lines at 2 feet intervals and to show the drainage system for the subdivision. This information should be shown on preliminary plats.
6. Offer the resources of the planning department to the Technical Coordinating Committee charged with the responsibility of preparing a Thoroughfare Plan for the Wilmington area.
7. Engender local support for the creation of a State Park in the vicinity of Snow's Cut.
8. Prepare a Land Development Plan for New Hanover County utilizing data from this report and other sources in order to provide a guide for desirable patterns of growth.

APPENDIX
POPULATION PROJECTIONS

Population projections presented on page 25 indicate a high growth rate is predicted for Wilmington and New Hanover County. These projections are higher than earlier estimates contained in a Population and Economy Study of Wilmington prepared by the Division of Community Planning in 1962.

The new estimates are based on a variety of factors analyzed by the Division of Community Planning and the Bureau of Census, U. S. Department of Commerce, based on statistics provided by:

- N. C. Department of Public Instruction
- N. C. Board of Health
- Employment Security Commission of North Carolina
- N. C. Department of Tax Research
- N. C. Department of Motor Vehicles
- U. S. Census of Agriculture, 1964. Bureau of the Census
- U. S. Census of Population, 1960. Bureau of the Census

It was determined that in the seven year period from July, 1960 to July, 1967 New Hanover County experienced a gain in population of approximately 9.5 percent. Population estimates for the period from 1965 to 1985 were partially based on increases noted between 1960 and 1967. The following input data were used to arrive at the percentage increase between 1960 and 1967:

1960 Actual total population	71,742
1960 Actual civilian population	70,912
Natural increase	5,487
Net migration	2,191
Net loss to armed forces	350
1967 Estimated civilian population	78,240
1967 Estimated total population	78,558
Percentage change	9.5

Additional indicators of growth include:

School enrollment (12 grades)	1960-1962	1962-1964	1964-1966
Percent change	+2.1	+3.6	+2.1
Employment	1960-1962	1962-1964	1964-1966
Employer reporting units	+2.0	+5.3	+4.6
Average monthly employment	+3.1	+8.7	+12.5

New manufacturing plants from 1961 to 1964 +8.

Automobile and truck registration. Percent change 1960-1966 +11.7.

Methodology of Population Projections

The estimate of New Hanover County's population in 1967 shows a 9.5% increase over a period of seven years, 1960-1967, an average annual growth rate of 1.4%. This growth rate has not been projected annually since a constant growth rate is unlikely to occur. Therefore the following growth rate percentages were used to arrive at population projections shown on page 25.

<u>PERIOD</u>	<u>APPROXIMATE GROWTH RATE PER YEAR</u>
1965-1970	1%
1970-1980	1.25%
1980-1985	2%

